

Minutes of Meeting #01 of RTCA SC-209 Working Group #1 For The Development & Maintenance of the Mode-S MOPS

<http://adsb.tc.faa.gov/SC209.htm>

Meeting #1 of Working Group #1 of RTCA/SC-209 was called to order by Co-Chair Tom Pagano at 9:00am EDT, 3 April 2007, at the facilities of RTCA in Washington DC. Mr. Pagano offered regrets from Doug Guetter of ACSS, Raymond Bayh of BAE Systems and Bill Thedford, Consultant for the USAF, for not being able to attend the meeting in person. Mr. Pagano then welcomed all attendees and asked that each attendee introduce themselves and their organization. The attendees for all or part of the meeting included the following:

Mark Annee, representing U.S. Navy	Pete Muraca, FAA Tech Center
Woody Bode, Freestate Electronics	Showkat Osman, Honeywell
David Bowen, Eurocae Technical Secretary (phone)	Tom Pagano, FAA Tech Center – AJP-1850
Robert Duffer, FAA	Robert Saffell, Rockwell Collins
John Fisher, Consultant U.S. Air Force (phone)	Todd Smith, DoD AIMS Program Office
Gary Furr, Engility Corp., FAATC–AJP-1850	Bill Thedford, Consultant, USAF (phone)
Doug Guetter, L-3/ACSS (phone)	John Van Dongen, FAA Tech Center – AJP-1850
Richard Jennings, FAA, AIR-130	Nolan Van Foeken, Garmin International (phone)
Andrew Leone, FAA Tech Center	Leo Wapelhorst, Engility Corp., FAATC-AJP-1850
Roland Mallwitz, DFS (phone)	Jerry Woodall, Raytheon Electronic Combat Systems

1. Agenda Item #1

- 1.1 Robert Duffer, the Designated Federal Official, additionally welcomed all attendees and thanked them for their participation.

2. Agenda Item #2

- 2.1 With the proposed meeting Agenda displayed, Mr. Pagano asked if there were any suggested additions or changes to the Agenda for this meeting. There were no suggested changes or additions, although there were suggestions on when to review certain items because of the availability of specific members. It was also agreed that Rich Jennings would report on the status of Working Group #2 under Agenda Item #13 for Other Business. Mr. Pagano declared that the Agenda was accepted and began to progress on the Agenda as offered to the Working Group.

3. Agenda Item #3

- 3.1 Mr. Pagano referred to Agenda Item #3 to discuss the Minutes of SC-209 Meeting #6, which was the Joint Plenary Session held in Melbourne Florida between SC-209 and Eurocae WG-49 members in late January and presented to this meeting as Working Paper ModeS-WP01-02. Rich Jennings inquired about the wording of an issue in item #5.2 regarding the P1 suppression. After discussion, there were agreed upon changes made to paragraph #5.2, and the Minutes of Meeting #6 will be reposted to the Working Group web site for this Meeting #1. With these changes, the Minutes of SC-209 Meeting #6 were accepted by the Working Group as presented in Working Paper ModeS-WP01-02R1.

- 3.2 Mr. Pagano inquired regarding paragraph #5.3 in the Minutes, which referenced the fact that Roland Mallwitz was to discuss the Hijack Mode with David Bowen of Eurocae. David Bowen had joined us on the teleconference phone and after a brief discussion, the Working Group agreed that we would continue to plan on placing the Hijack Mode into DO-181D as an Appendix “D.” David Bowen indicated that he would have further discussions with WG-49 and EASA with respect to this item.
- 3.3 Mr. Pagano also inquired regarding paragraph #7.2 with respect to the generic test procedures. It was understood that SC-209 would create an Appendix “E” to DO-181D for generic test procedures.

4. Agenda Item #4

- 4.1 Mr. Pagano asked David Bowen to discuss the Status of WG-49. David indicated that Antoine Herve was considering the position of Chairman, and if Antoine was not able to accept this position, David Bowen indicated that he will personally Chair WG-49 during the duration of the effort to produce the modifications of the Transponder MOPS documents.

5. Agenda Item #8

- 5.1 The Committee continued with the Agenda by going on to Agenda Item #8 with a presentation of Working Paper ModeS-WP01-07R2 and ModeS-WP01-09 for the modification of Appendix B with respect to the execution of Action Item 6-4. Gary Furr took the Action to make changes to all of the Register tables that reference specifically ICAO Doc 9871, §A.2.2.2 to change them to reference §B.3.1.2. This action was accomplished during the meeting. These and any other changes to the draft Appendix B will be available for review in version 1.6 which will be made available to WG-49 prior to their meeting in Paris 14 – 16 May.

6. Agenda Item #5

- 6.1 The Committee continued with Agenda Item #5, starting with the review of Working Paper ModeS-WP01-08 from Andy Leone. Andy proposed updating the Reply Request Uplink Field. After discussion, the Working Group agreed that the proposed change to the RR table was not accepted, and the Working Group asked Andy to revise his proposal by removing his proposed additions to the RR Code table, and instead, add to the note below the table for clarification. These changes were made during the meeting and the revisions to this Working Paper are represented in a revision named ModeS-WP01-08R1 and will be posted to the Working Group web page after the meeting. Further, the proposed changes will be made to the next draft of DO-181D as agreed to in the revised Working Paper.
- 6.2 The Working Group continued with the beginning of the review of Working Paper ModeS-WP01-03 by Bob Saffell for the draft of requirements and test procedures for Elementary and Enhanced Surveillance. Bob stepped the Working Group down through the entire Working Paper, reviewing each section in as much detail as required.

The list of consolidated comments to the proposed ELS and EHS Requirements and Test Procedures were presented in ModeS-WP01-16. Additional comments were received during the meeting and therefore WP01-16 was revised to become ModeS-WP01-16R1, and the comments were annotated as to the resolution and Working Group disposition as reflected in WP01-03R1. Numerous edits were applied to the ELS & EHS Working Paper during its review, and reflected in a revision to the Working Paper which will be posted on the Working Group web page as ModeS-WP01-03R1. This revised Working Paper will also serve as input to the upcoming WG-49 meeting in May.

- 6.3 With the availability of certain manufacturers on the teleconference, the Working Group began to review the Working Papers that reflected the responses by the manufacturers to the Action Item 6-4 for the various Reply Rate Capabilities of their transponders. These reviews cover Working Papers ModeS-WP01-10 through ModeS-WP01-15. This action became necessary because of the differences in the requirements between the ICAO Annex 10, Vol-IV, §3.1.1.7.9, ED-73B, §3.4.1 and DO-181D, §2.2.3.4.1. The draft of ED-73C complies with the language in Annex 10, but the language in DO-181x appears to have never complied with either the Annex 10 or ED-73C. All manufacturers report that they can meet the 1200 replies without limiting applied. The reply rate limiting is a problem caused by the ICAO Annex 10 language. An Action Item WG1-1-2 was accepted by Rich Jennings, Rob Duffer and Tom Pagano to talk to Kevin Hallworth regarding the differences in this area, and to explore the possibility of entering a USA comment regarding the language in Annex 10. Further discussion will be held by Bob Saffell with Vince Orlando to see if Bob can determine why the language became different specifically in DO-181x.

7. Agenda Item #7

- 7.1 The Committee continued with the Agenda by going on to Item #7 as presented by John Van Dongen for his proposed changes to some of the test procedures in DO-181D. John presented Working Paper ModeS-WP01-05 as recommended changes to the Comm-B Protocol Test Procedure #18 in an attempt to simplify the test procedure. The Working Group held considerable discussion related to how these test procedures and Figure 2-19 relate to each other. Bob Saffell commented that for Rockwell Collins, Figure 2-19 was basically the requirement, because most of the requirements in DO-181C in section 2.2 actually refer to the Figure 2-19.

- 7.2 Working Paper ModeS-WP01-06 was also reviewed in conjunction with the proposals in ModeS-WP01-05 since they relate to each other. Bob Saffell provided research on Figure 2-19 showing that there was a change dating back to DO-181A and DO-181B that shows a correction very similar to the one that John proposes in Working Paper ModeS-WP01-06. Bob Saffell agreed to take an Action Item to review his versions of Figure 2-19 versus that proposed by John in ModeS-WP01-06 and get back to the Working Group with his proposal and recommendation. With further discussion by the Working Group, it was agreed that the proposals in Working Papers ModeS-WP01-05 and ModeS-WP01-06 would be brought to WG-49 for the proposed changes identified. It was agreed that Action Item WG1-1-1 will be assigned to all Manufacturers to review Working Papers ModeS-WP01-05 and ModeS-WP01-06 in detail prior to agreeing to make the proposed changes. No changes will be made to the draft of DO-181D with respect to these Working Papers until a recommendation is reviewed at the next Working Group 1 meeting in late May.

8. Agenda Item #6

- 8.1 The Committee continued with the Agenda by going on to Item #6 for the proposed Appendix C to DO-181D as the Dataflash Application. It was agreed that both SC-209 and WG-49 personnel should review the proposed Appendix C as Action Item WG1-1-3. Roland Mallwitz commented that it appears that ED-101 §5.3.3.1 should be included in the Appendix C. Andy Leone pointed out that we should not reference ICAO Doc 9688, but should change that reference to ICAO Doc 9871. Gary Furr will make the referenced revisions and make the proposed Appendix available for review at the WG-49 meeting. The revision to this Appendix along with any comments from WG-49 will be reviewed again at the next Working Group #1 meeting in late May.

9. Agenda Item #9

- 9.1 The Working Group heard from Bill Thedford regarding his review of the differences between ED-73C and DO-181D. He reports that he is about half way through the detailed review and that he will continue the review until it is completed prior to the proposed WG-49 meeting on May 14. Gary Furr agreed to send Bill the version of DO-181D that comes out of this meeting for his further review. Bill submitted what was labeled as Working Paper ModeS-WP01-19 as a sample of the current differences he has found between the current drafts of ED-73C and DO-181D.

10. Agenda Item #13

- 10.1 The Working Group requested that Rich Jennings give a short summary of the status of the efforts of Working Group #2 for the modification of the ATCRBS MOPS, DO-144. Rich reports that sections 1 and 2 have basically been completed. He performed a comparison of section 2.2 to ICAO Annex 10 and has found some items where we differ. The FAA Tech Center Working Group 2 members have reviewed the draft and organized it according to the structure of the Mode-S MOPS. The detailed requirements and test procedures are now being reviewed by other Working Group 2 members. Terry Pearsall has agreed to review sections 3 and 4 of the basic MOPS documents and try to combine them into a single section.

- 10.2 Jerry Woodall submitted what was labeled as Working Paper ModeS-WP01-18. Jerry had offered the Working Paper to support discussion of the problem related to transponders recognizing ATCRBS interrogations from pulses detected from the P6 pulse due to the DPSK modulation. The phenomena can occur at low signal amplitudes when the P1 – P2 of the Mode S interrogation does not result in the transponder being suppressed and a pulse is detected during the P6 which combines with the P1 or P2 pulse and corresponds to the valid ATCRBS interrogation pulse spacing.

11. Agenda Item #11

- 11.1 The Working Group reviewed the calendar for proposed future meeting dates. The dates for the next WG-49 meeting were confirmed by David Bowen to be at Paris on 14 – 16 May 2007. Working Group 1 therefore decided that the next WG1 meeting should be held again at RTCA on 30 May through 1 June 2007. Since it has been agreed by both WG-49 and SC-209 WG1 that there should be another Joint Plenary to review both MOPS documents prior to them being submitted to their respective organizations for approval, it was decided that a proposed Joint meeting date would be 24 – 27 July at Eurocontrol Headquarters in Brussels. This proposal will be taken by Bob Saffell and Bill Thedford to the WG-49 meeting in Paris in May. No further meeting planning was performed at this time.

12. Agenda Item #10

- 12.1 The list of open Action Items was reviewed by the Working Group, and the summary of Action Items that remained open, or were newly recorded as being assigned and accepted during this Meeting are as follows:

Action Number	Open Action Item Descriptions	Assigned to	Status
1-3	Coordinate with Stuart Searight to make sure that all of the TCAS issues are accounted for.	Tom Pagano Gary Furr	Ongoing
2-2	Resolve the differences in the “Reply Rate” requirements in the following sections: (1) DO-181C, §2.2.3.4.1, (2) ED-73B, §3.4.1, (3) SARPs Annex 10, Vol-IV, §3.1.1.7.9 Changes started coming into DO-181 at the original DO-181, change 2.	Doug Guetter Bob Saffell	ModeS-WP01-10 thru ModeS-WP01-15
3-3	Approach Kevin Hallworth at EASA with the points of discussion regarding all differences in DO-181D and ED-73C and the SARPs.	Rob Duffer	Ongoing
3-4	Review the proposed changes to the test procedures in §2.4.2.7 with his transponder and DME experts to see what they think about the proposed changes	Bob Saffell	
5-1	Modify the draft of DO-181D to include references to Appendix B and capture MSP processing in the Transponder.	Tom Pagano Showkat Osman	
5-2	Review all of Section 1 for revisions/additions	Tom Pagano	
6-1	Open a discussion with Eurocae Technical Secretary regarding what to do with respect to the Hijack Mode, which remains in the draft of ED-73C, but has been left out of the draft of DO-181D.	Roland Mallwitz	
6-5	Revise the test procedures identified in WG49N8-17 for test steps previously in DO-181D, §2.4.2.6, Step 7 and add the test for UF11 prior to Meeting #7 for the review of SC-209.	Bob Saffell	

Action Number	Open Action Item Descriptions	Assigned to	Status
6-6	Review the environmental test procedures in ED-73C and make a recommendation to WG-49 during their next meeting for harmonizing the two documents.	Antoine Herve	
6-7	Review the draft the CW Interference requirements and test procedures that are presented in Working Paper WP B5-10. If complete, then Gary Furr will insert the text into the next draft of DO-181D.	Bob Saffell Gary Furr	OK TO IMPLEMENT
6-8	Review the difference in §5.4.2.2.2.b in ED-73C with §2.4.2.2.2, Step 2 in DO-181D, and resolve the differences identified in SC209-WP06-09.	Bob Saffell	
6-9	Review the difference in §5.4.7.2, steps 5 and 6 in ED-73C with §2.4.2.7, which has steps 1 through 4, but is missing the equivalent to steps 5 and 6 from ED-73C.	H/W Vendors	
6-10	Review and edit Step 5 of §2.4.2.12.1 (Fixed Data) and in §2.4.2.12.2 (Variable data) for Invalid Addresses. Note that perhaps the test for variable data is not appropriate.	Bob Saffell	
6-11	Review the test procedure in §5.4.12.2.2, of ED-73C and verify that it should remain in that section or be moved to another section.	WG-49	
6-12	In §5.4.12.3.2 in ED-73C, in step #2, the difference includes the exclusion of UF=24. Review why this is different from §2.4.2.12.3, Step 2 in DO-181D.	WG-49	
6-13	Review step sections “d” and “e” in the draft of ED-73C, §5.5.8.34 to determine if they are valid.	WG-49	
6-14	With respect to Procedure #9 in §2.5.4.8 of DO-181D and §5.5.8.8 of ED-73C, WG-49 will review why the text was written as it is presented.	WG-49	
6-15	With regard to the Validation of On-The-Ground Status, both DO-181D and ED-73C text needs to be checked for consistency with the changes to the Air/Ground Determination and Validation of On-Ground Determination that were accepted in the ADS-B MASPS, 1090ES and UAT MOPS, and UAT and 1090ES SARPs. Additionally, there is a difference in the way ED-73C and DO-181D handle the On-Ground status, with respect to relating to “1090ES only” or to “everything.” This will require further discussion at our next Joint Plenary Session. Gary Furr will make this review and provide a Working Paper summarizing the required changes, if any.	Gary Furr	
WG1-1-1	All Manufacturers will review Working Papers ModeS-WP01-05 and ModeS-WP01-06 in detail in an effort to ensure that the proposed changes to the test procedures and to Figure 2-19 are well reviewed.	Rockwell, Honeywell, L-3/ACSS, Garmin, BAE Systems, Raytheon	
WG1-1-2	Have a discussion with Kevin Hallworth regarding the differences in Reply Rate Capability that exists between ICAO Annex 10, ED-73C and DO-181D.	Jennings, Duffer Pagano	
WG1-1-3	Complete a detailed review of the proposed Appendix C to DO-181D which is a copy of the Dataflash Application information from the latest draft of ED-101.	All SC-209 & WG-49	
WG1-1-4	Propose parameters for the DO-160E test frequency exclusion for environmental testing section in both DO-181D and DO-144A.	Nolan Van Foeken	

13. The **Working Papers** for all SC-209 Meetings, as well as the Meeting Agendas, Meeting Minutes, Meeting Schedules and proposed modifications to the ATCRBS and Mode-S MOPS will be posted on the web site maintained by Gary Furr at the FAA William J Hughes Technical Center, located at: <http://adsb.tc.faa.gov/SC209.htm>

As reported in the Meeting Summary of Eurocae WG-49, Meeting #6, members of SC-209 may access the WG-49 workspace through the Eurocae web site located at:
<http://www.eurocae.org/> Login: WG49 and password: MODE-S

Also, the workspace of Eurocae WG-51 can be accessed by SC-209 members through the same Eurocae web site with: Login: WG51 and password: ADSB